



MATHESON

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Safety Data Sheet

Material Name CYCLOHEXANE

SDS ID: MAT05870

Section 1 - IDENTIFICATION

Product Identifier: CYCLOHEXANE

Trade Names/Synonyms

MTG MSDS 92; HEXAHYDROBENZENE; HEXAMETHYLENE; HEXANAPHTHENE; BENZENE HEXAHYDRIDE;
UN 1145; C6H12

Chemical Family

hydrocarbons, alicyclic

Recommended Use

industrial

Restrictions on Use

None known.

Manufacturer Information

MATHESON TRI-GAS, INC.
150 Allen Road, Suite 302
Basking Ridge, NJ 07920

General Information: 1-800-416-2505
Emergency #: 1-800-424-9300 (CHEMTREC)
Outside the US: 703-527-3887 (Call collect)

Section 2 - HAZARDS IDENTIFICATION

Classification in accordance with 29 CFR 1910.1200

Flammable Liquids, Category 2
Acute Toxicity (Inhalation), Category 4
Skin Corrosion / Irritation, Category 2
Eye Damage / Irritation, Category 2A
Toxic to Reproduction, Category 2
Specific Target Organ Toxicity - Single Exposure, Category 2 (circulatory system)
Specific Target Organ Toxicity - Single Exposure, Category 3 (central nervous system and respiratory system)
Hazardous to the Aquatic Environment - Acute Hazard, Category 1
Hazardous to the Aquatic Environment - Chronic Hazard, Category 1

GHS LABEL ELEMENTS

Symbol(s)



Signal Word

DANGER

Hazard Statement(s)

Highly flammable liquid and vapor
Harmful if inhaled
Causes skin irritation

Safety Data Sheet

Material Name CYCLOHEXANE

SDS ID: MAT05870

Causes serious eye irritation
Suspected of damaging fertility or the unborn child
May cause damage to circulatory system.
May cause respiratory irritation
May cause drowsiness and dizziness
Toxic to aquatic life
Very toxic to aquatic life with long lasting effects

Precautionary Statement(s)

Prevention

Keep away from heat, sparks, open flame, and hot surfaces - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharges. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Do not breathe vapor or mist. Use only outdoors or in a well-ventilated area. Wash thoroughly after handling. Wear protective gloves and eye/face protection. Do not eat, drink or smoke when using this product. Avoid release to the environment.

Response

In case of fire, use media appropriate for extinction. IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell. IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs, get medical advice/attention. Wash contaminated clothing before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention. Collect spillage.

Storage

Store in a well-ventilated place. Keep container tightly closed. Keep cool. Store locked up.

Disposal

Dispose of in accordance with applicable regulations.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

CAS	Component	Percent
110-82-7	CYCLOHEXANE	100

Section 4 - FIRST AID MEASURES

Description of Necessary Measures

Inhalation

If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

Skin

Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

Eyes

Flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Then get immediate medical attention.

Safety Data Sheet

Material Name CYCLOHEXANE

SDS ID: MAT05870

Ingestion

DO NOT induce vomiting. If vomiting occurs, keep head lower than hips to help prevent aspiration. Get immediate medical attention.

Most Important Symptoms/Effects

Acute

respiratory tract irritation, skin irritation, eye irritation, lung damage (from aspiration), central nervous system depression, circulatory system damage

Delayed

reproductive effects

Indication of Immediate Medical Attention and Special Treatment

For inhalation, consider oxygen.

Section 5 - FIRE FIGHTING MEASURES

Suitable Extinguishing Media

regular dry chemical, carbon dioxide, water spray, regular foam
Large fires: Use water spray, fog or regular foam.

Unsuitable Extinguishing Media

Do not use high-pressure water streams.

Specific Hazards Arising from the Chemical

Severe fire hazard. Moderate explosion hazard. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Vapor/air mixtures are explosive.

Hazardous Combustion Products

Combustion: oxides of carbon

Fire Fighting Measures

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Do not scatter spilled material with high-pressure water streams. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Water may be ineffective.

Special Protective Equipment and Precautions for Firefighters

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

Section 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Wear personal protective clothing and equipment, see Section 8. Avoid release to the environment.

Safety Data Sheet

Material Name CYCLOHEXANE

SDS ID: MAT05870

Methods and Materials for Containment and Cleaning Up

Avoid heat, flames, sparks and other sources of ignition. Eliminate all ignition sources if safe to do so. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Stop leak if possible without personal risk. Prevent entry into waterways, sewers, basements, or confined areas. Vapor-suppressing foam may be used to control vapors. Collect spillage. **Small spills:** Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Use clean non-sparking tools to collect absorbed material and place it into loosely-covered metal or plastic containers for later disposal. **Large spills:** Dike for later disposal. Stay upwind and keep out of low areas. Ventilate closed spaces before entering. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

Section 7 - HANDLING AND STORAGE

Precautions for Safe Handling

Keep away from heat, sparks, open flame, and hot surfaces - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Do not breathe vapor or mist. Use only outdoors or in a well-ventilated area. Wash thoroughly after handling. Wear protective gloves and eye/face protection. Do not eat, drink, or smoke when using this product. Avoid release to the environment.

Conditions for Safe Storage, including any Incompatibilities

Store and handle in accordance with all current regulations and standards. Store in a well-ventilated place. Keep container tightly closed. Keep cool. Store locked up. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106. Grounding and bonding required. Keep separated from incompatible substances.

Incompatibilities oxidizing materials, combustible materials

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Component Exposure Limits

CYCLOHEXANE (110-82-7)

ACGIH:	100 ppm TWA
Europe:	200 ppm TWA; 700 mg/m ³ TWA
OSHA (Final):	300 ppm TWA; 1050 mg/m ³ TWA
OSHA (Vacated):	300 ppm TWA; 1050 mg/m ³ TWA
NIOSH:	300 ppm TWA; 1050 mg/m ³ TWA

Component Biological Limit Values

There are no biological limit values for any of this product's components.

IDLH

1300 ppm

Appropriate Engineering Controls

Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Individual Protection Measures, such as Personal Protective Equipment

Eyes/Face Protection

Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Safety Data Sheet

Material Name CYCLOHEXANE

SDS ID: MAT05870

Skin Protection

Wear appropriate chemical resistant clothing.

Glove Recommendations

Wear appropriate chemical resistant gloves.

Respiratory Protection

The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
1300 ppm

Any supplied-air respirator operated in a continuous-flow mode.

Any powered, air-purifying respirator with organic vapor cartridge(s).

Any air-purifying respirator with a full facepiece and an organic vapor canister.

Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister.

Any self-contained breathing apparatus with a full facepiece.

Any supplied-air respirator with a full facepiece.

Emergency or planned entry into unknown concentrations or IDLH conditions -

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

Escape -

Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister.

Any appropriate escape-type, self-contained breathing apparatus.

* * *Section 9 - PHYSICAL AND CHEMICAL PROPERTIES* * *

Physical State:	Liquid	Appearance:	clear, colorless liquid
Color:	colorless	Physical Form:	liquid
Odor:	faint odor, sweet odor	Odor Threshold:	0.41 ppm
pH:	Not available	Melting/Freezing Point:	7 °C
Boiling Point:	81 °C	Flash Point:	-20 °C (CC)
Decomposition:	Not available	Evaporation Rate:	6.1 (butyl acetate = 1)
OSHA Flammability Class:	IB	LEL:	1.3 %
UEL:	8.4 %	Vapor Pressure:	95 mmHg @ 20 °C
Henry's Law Constant:	0.15 atm-cu m/mole	Vapor Density (air = 1):	2.90
Specific Gravity (water=1):	0.779	Water Solubility:	<0.01 %
Log KOW:	3.44	KOC:	160
Auto Ignition:	245 °C	Viscosity:	0.914 cP @22 °C
Volatility:	100 %	Molecular Weight:	84.18
Molecular Formula:	C-H2-(C-H2)4-C-H2		

Other Property Information

No information available.

Solvent Solubility

Soluble: methanol, ethanol, ether, acetone, benzene, ligroin, carbon tetrachloride

Safety Data Sheet

Material Name CYCLOHEXANE

SDS ID: MAT05870

Section 10 - STABILITY AND REACTIVITY

Reactivity

No reactivity hazard is expected.

Chemical Stability

Stable at normal temperatures and pressure.

Possibility of Hazardous Reactions

Will not polymerize.

Conditions to Avoid

Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.
Keep out of water supplies and sewers.

Incompatible Materials

oxidizing materials, combustible materials

Hazardous Decomposition

Combustion: oxides of carbon

Section 11 - TOXICOLOGICAL INFORMATION

Acute and Chronic Toxicity

Component Analysis - LD50/LC50

The components of this material have been reviewed in various sources and the following selected endpoints are published:

CYCLOHEXANE (110-82-7)

Dermal LD50 Rabbit >2000 mg/kg; Inhalation LC50 Rat 13.9 mg/L 4 h; Oral LD50 Rat >5000 mg/kg

RTECS Acute Toxicity (selected)

The components of this material have been reviewed, and RTECS publishes the following endpoints:

CYCLOHEXANE (110-82-7)

Inhalation: 70000 mg/m3/2 hour Inhalation Mouse LC50
>9500 ppm/4 hour Inhalation Rat LC50

Acute Toxicity Level

CYCLOHEXANE (110-82-7)

Moderately Toxic: inhalation

Slightly Toxic: ingestion

Information on Likely Routes of Exposure

Inhalation

irritation, nausea, vomiting, headache, drowsiness, dizziness, loss of coordination, coma

Ingestion

headache, drowsiness, dizziness, loss of coordination

Skin Contact

irritation

Eye Contact

irritation

Immediate Effects

respiratory tract irritation, skin irritation, eye irritation, central nervous system depression, circulatory system damage, lung damage (from aspiration)

Delayed Effects

reproductive effects

Medical Conditions Aggravated by Exposure

kidney disorders, liver disorders, respiratory disorders, skin disorders and allergies

Safety Data Sheet

Material Name CYCLOHEXANE

SDS ID: MAT05870

Irritation/Corrosivity Data

respiratory tract irritation, skin irritation, eye irritation

RTECS Irritation

The components of this material have been reviewed, and RTECS publishes the following endpoints:

CYCLOHEXANE (110-82-7)

1548 mg/2 day(s) intermittent Skin Rabbit

Local Effects

CYCLOHEXANE (110-82-7)

Irritant: inhalation, skin

Target Organs

CYCLOHEXANE (110-82-7)

central nervous system

Respiratory Sensitization

No data available.

Dermal Sensitization

No data available.

Carcinogenicity

Component Carcinogenicity

None of this product's components are listed by ACGIH, IARC, NTP, OSHA or DFG.

RTECS Mutagenic

The components of this material have been reviewed, and RTECS publishes data for one or more components.

Reproductive Effects Data

Available data characterizes this substance as a reproductive hazard.

RTECS Reproductive Effects

The components of this material have been reviewed, and RTECS publishes the following endpoints:

CYCLOHEXANE (110-82-7)

7000 ppm Inhalation Rat TCl₀ (Multigeneration); 2000 ppm Inhalation Rat TCl₀ (Multigeneration); 6000 ppm

Inhalation Rat TCl₀ (pregnant 7-16 day(s))

RTECS Tumorigenic

The components of this material have been reviewed, and RTECS publishes data for one or more components.

Additional Data

Alcohol may enhance the toxic effects.

Specific Target Organ Toxicity - Single Exposure

circulatory system, central nervous system, respiratory system

Specific Target Organ Toxicity - Repeated Exposure

No data available.

Aspiration Hazard

May cause aspiration hazard.

Section 12 - ECOLOGICAL INFORMATION

Ecotoxicity

Toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

Safety Data Sheet

Material Name CYCLOHEXANE

SDS ID: MAT05870

Component Analysis - Aquatic Toxicity

CYCLOHEXANE (110-82-7)

Fish: 96 Hr LC50 Pimephales promelas: 3.96 - 5.18 mg/L [flow-through]; 96 Hr LC50 Pimephales promelas: 23.03 - 42.07 mg/L [static]; 96 Hr LC50 Lepomis macrochirus: 24.99 - 44.69 mg/L [static]; 96 Hr LC50 Poecilia reticulata: 48.87 - 68.76 mg/L [static]

Algae: 72 Hr EC50 Desmodesmus subspicatus: >500 mg/L

Persistence and Degradability

Not readily biodegradable.

Bioaccumulative Potential

Bioconcentration potential in aquatic organisms is moderate based on a BCF value of 89.

Mobility

Expected to have moderate mobility in soil.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262.

Hazardous Waste Number(s): D001.

Component Waste Numbers

CYCLOHEXANE (110-82-7)

RCRA: waste number U056 (Ignitable waste)

Section 14 - TRANSPORT INFORMATION

US DOT Information

Shipping Name: Cyclohexane

UN/NA #: UN1145 **Hazard Class:** 3 **Packing Group:** II

Required Label(s): 3

IMDG Information

Shipping Name: Cyclohexane

UN #: UN1145 **Hazard Class:** 3 **Packing Group:** II

Required Label(s): 3

Section 15 - REGULATORY INFORMATION

Component Analysis

U.S. Federal Regulations

This material contains one or more of the following chemicals required to be identified under SARA Section 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.

CYCLOHEXANE (110-82-7)

SARA 313: 1.0 % de minimis concentration

CERCLA: 1000 lb final RQ; 454 kg final RQ

SARA 311/312 Hazardous Categories

Acute Health: Yes **Chronic Health:** Yes **Fire:** Yes **Pressure:** No **Reactive:** No

Safety Data Sheet

Material Name CYCLOHEXANE

SDS ID: MAT05870

U.S. State Regulations

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA
CYCLOHEXANE	110-82-7	Yes	Yes	Yes	Yes	Yes

Not regulated under California Proposition 65

Component Analysis - Inventory

Component	CAS	US	CA	EU	AU	PH	JP	KR	CN	NZ
CYCLOHEXANE	110-82-7	Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	Yes

Section 16 - OTHER INFORMATION

NFPA Ratings: Health: 2 Fire: 3 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID - European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

Other Information

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End of Sheet MAT05870